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New Oat Disease Increases Importance of Seed Treatment

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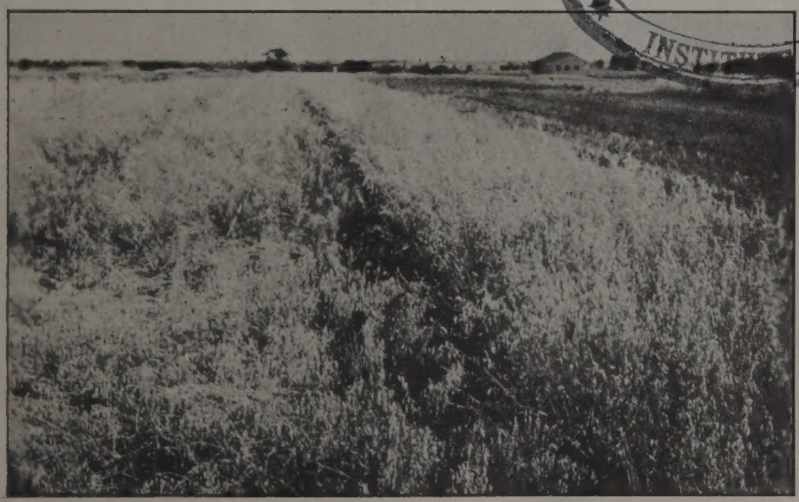
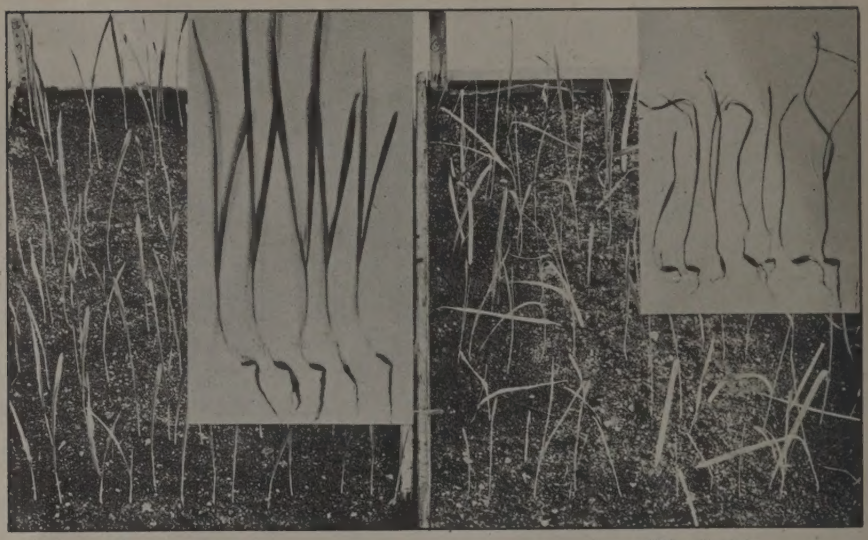


Fig. 1.—Left: An oat variety, susceptible to the new blight and root-rot disease, showing the characteristic breaking over of the stems. Right: In contrast, this resistant variety, with the same chance for infection, is erect.

In 1946 conditions were such that Missouri farmers harvested an excellent oat crop. Weather permitted early planting, and the month of June was generally free from drought. In spite of the high average yield, individual farmers submitted reports of premature dying, excessive lodging, even failure to head in some cases. Why, with such excellent growing conditions and in the almost complete absence of rust, were these reports so frequently received?



Resistant Variety Susceptible Variety

Fig. 2.—The oat seedlings of the susceptible variety (at the right) are severely affected, while those of the resistant variety (at the left), with the same chance for infection, are healthy.

The explanation lies in the appearance of a disease new to our oat crop. This disease, a blight and root-rot, is caused by the fungus *Helminthosporium victoriae*. This blight may attack the oat plant early, killing some seedlings even before they emerge above the surface of the ground. Infected seedlings which emerge and survive show dark brown areas near the soil line. The disease spreads upward to the leaves which exhibit long, yellow-green to orange-brown streaks sometimes running their full length. Such plants produce poorly filled heads or may fail to head at all.

As the crop matures, the plants lodge, breaking at the joints. (Fig. 1.) Infected plants may be pulled from the ground easily—their root systems are almost entirely rotted away. The spores of the fungus (*Helminthosporium*) may be found as a dark dusty mass, principally on the joints of the infected plants, although the spores have been found on every part of the plant.

This new disease of oats was first observed at Ames, Iowa, in 1944. During 1946 its occurrence was reported in areas of the oat belt extending from the Rocky Mountains to the Atlantic coast. Reports from all of these areas record severe losses; so severe, in fact, that varieties susceptible to *Helminthosporium* may decline in popularity even though they are resistant to rust and smut.

P.A.B

Many varieties have been tested for their resistance to the new disease. It has been found that all the newer varieties which have the South American variety, Victoria, as one of their parents are susceptible. These varieties include Boone, Tama, Control, Vicland, Cedar, Forvic, Vikota, Osage, Neosho and others. The above varieties, because of their resistance to smuts and to leaf and stem rust, have done much in increasing the oat yields of the past few years. Varieties of Victoria parentage are planted on about one-third of Missouri's oat acreage, chiefly in the northwest part of the state. They have been widely grown in this area and have proven their superiority in rust years. These varieties are considered somewhat later in maturity than the variety Columbia. The principal variety grown in the other sections of the state is Columbia, a variety that is early, of good quality, susceptible to both rusts and smut, but apparently resistant to the new blight and root-rot disease.

Fortunately, other new varieties of oats, among them the variety Clinton, carry resistance to the rusts and smuts and also to the new disease. It is possible that varieties with such resistance, adapted to Missouri conditions, will become available in the near future. Seed of Clinton will not be available in sufficient quantity for the 1947 crop.

Losses from this new disease could be prevented by planting the variety Columbia. However, the smut and rust resistance of the newer varieties has proved valuable. The high regard of farmers

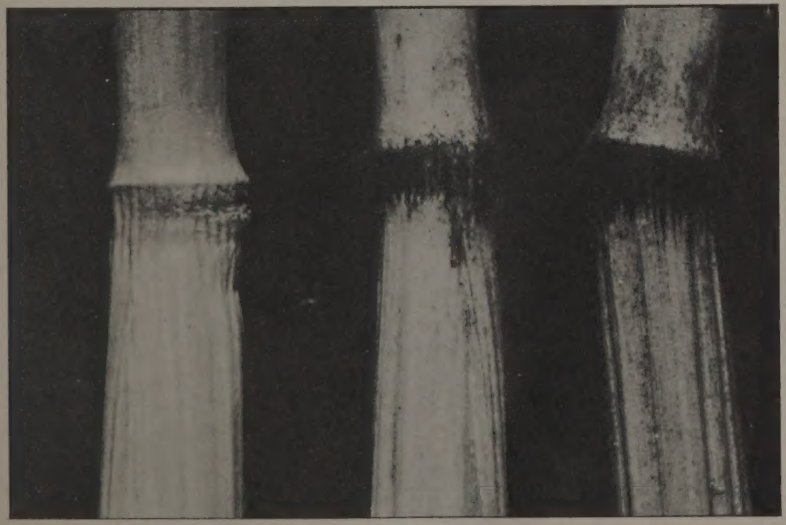


Fig. 3.—The two mature stems to the right show typical symptoms of the disease. They are darkened at the joints by the spores of *Helminthosporium*. The stem on the left is from a resistant variety and is clean and bright.

for these varieties is shown by the rapid shift to their use in recent years, and their popularity should increase unless damage by the new blight and root-rot renders them unprofitable.

It is probable that about two-thirds of the total state acreage in 1947 will be planted with the variety Columbia—susceptible to the rusts and smuts but resistant to the new disease. The remaining third, principally in northern Missouri, will be planted with varieties resistant to rusts and smuts but susceptible to the new disease.

It has been demonstrated that seed treatment with New Improved Ceresan, an organic mercury dust, at the rate of one-half ounce per bushel will partially control this new blight and root-rot disease. This dust can be obtained at most local seed and supply stores. Treatment of small lots can be made by mixing the proper amount of dust with the dry seed, then shoveling the mixture until all seed is uniformly covered with the dust. Care should be taken to avoid inhalation of the dust as it is poisonous. Treated seed should not be fed to livestock. It is suggested that the County Agent be consulted if large quantities of seed are to be treated. He will have information on treating machines which the farmer can construct and use, or supply the names of local firms which do seed treatment.

Experiments have shown that seed of susceptible varieties, when treated with New Improved Ceresan, will produce healthy plants which, however, may later become infected from the soil of infested fields. This disease is so new that there is very meager information on methods of infection and the effects of weather conditions on its occurrence and severity. Neither is there information on the extent to which the organism will build up in the soil over a period of years.

Seed treatment will improve the stand and protect the newer rust and smut resistant varieties to a large degree from losses caused by the blight and root-rot disease. In addition, the seed treatment will practically eliminate smut in Columbia and similar varieties.